UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-338/92-07 and 50-339/92-07

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-338 and 50-339 License Nos.: NPF-4 and NPF-7

Facility Name: North Anna 1 and 2

Inspection Conducted: March 16-20, 1992

Inspector: M D Hunt for 4/14/92
H. L. Whitener Date Signed

Approved by: Frank Jape 4/16/92
F. Jape, Chief Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of local leak rate testing and followup of licensee action on previously identified inspection findings.

Results:

In the areas inspected, violations or deviations were not identified. The licensee has developed and implemented a local leak rate test program which is adequate to meet regulatory requirements. During program review and observation of testing several positive aspects of the leak rate test program were noted (paragraph 2). These include:

1. Maintenance of the total Type B and Type C leakage at a low value. (i.e., Unit 1 was only 17 percent of the allowable 0.6 La leakage).

2. Identification and correction of leakage problem valves. (i.e., modification of the six inch mission check valves).

3. Clear component identification by tagging the components.

4. Improvement in test methods. (i.e., reduction of leak by tests where achievable).

The inspector considered these actions as evidence of management's commitment to maintain a quality leak rate program.

The issue of non-conservative Type C testing has been resolved by performing the tests in the accident direction. (VIO 338,339/89-12-01)

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. Enfinger, Assistant Station Manager (O&M)
*J. Hayes, Superintendent of Operations
*G. Kane, Station Manager
J. Leberstien, Engineer
K. Link, Operations
*T. Porter, Supervisor ISI
*J. Smith, QA Manager
M. Tower, System Engineer

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

NRC Resident Inspectors

*D. Taylor, Resident Inspector

*Attended exit interview

2. Local Leak Rate Testing (61720)

An important part of monitoring and maintaining containment integrity is the periodic testing performed to verify the leak tightness of containment leakage barriers. The inspector reviewed formal procedures established by the licensee to verify local leak tightness of leakage barriers. Documents reviewed either totally, or in part, to verify that the licensee has established adequate procedures and controls included:

2-PT-61.3, Revision 17, Containment Type C Test,

2-PT-62.1, Revision 8, Containment Air Locks - Leakage Rate,

0-PT-68.5, Revision 0, Leak Test of Containment Atmosphere Cleanup System,

2-PT-61.3.5, Revision 0-P1, Containment Purge Valves Type C Test,

2-PT-61.3.6, Revision 0, Containment Type C Test of LHSI, HHSI, Charging, and Loop Fill Penetrations,

2-PT-61.2.1, Revision 8, Containment Type B Testing - Electrical Penetrations,

Leakage Log - (The Official Summation of Type B and Type C leak rates),

Containment Integrated Leak Rate Report - Unit 1, July 1989 (Portion pertaining to Type B and Type C leakage Rates),

Containment Integrated Leak Rate Report - Unit 2, October 1990 (Portion pertaining to Type B and Type C leakage Rates),

2-PT-61.3.4, Revision 1, Total Local Leak Rate Calculation.

The above documents were reviewed in general for assignment of responsibility, adequate instructions, control of test activity, appropriate test intervals, appropriate test parameters, approved test methods and adequate acceptance criteria. A detailed walk through of the procedures for local leak testing was performed for 25 Type C test penetrations. No problems were identified relative to venting, draining, valve identification, valve alignment, system restoration, test parameters, acceptance criteria or required data , for "as found" and "as left" leak rates.

Although not all of the local leak rate tests were reviewed in step by step detail, based on the sample reviewed and the administrative controls in effect, the inspector concluded that programmatically the licensee has developed a containment local leak rate measurement program which is consistent with the regulatory requirements of the Technical Specification; 10 CFR 50, Appendix J; and ANSI-N45.4-1972.

Local leak rate Type B and Type C test result summaries were reviewed. The licensee tracks the leakage rate in a computerized program which is up-dated daily. The total leak rate is then tracked by PT-61.3.4 and also manually entered into the official leakage log. The inspector reviewed penetration leakage summary data for Unit 1 from the Fall 1984 outage through the Spring 1989 outage and the leakage log from the recent (December 1991 - March 1992) outage for Unit 1. The leakage log showed that the "as left" total local leakage for Unit 1 subsequent to the recent outage was 30.85 ± 1.97 scfh. This is about 17 percent of the allowable limit of 0.6 La which is 182.6 scfh. For Unit 2, the inspector reviewed data from the Spring 1989, Fall 1990, and the current outage.

Based on these reviews the inspector concluded that the licensee has routinely performed Type B and Type C leak rate tests and has maintained the leak rate limit as required by the regulations. The low leak rates achieved in the local test program are considered a strength.

The inspector also discussed control of the leakage rates where the administrative leak rate limit specified in procedure PT 61.3 is exceeded. The regulation leak rate limit is that the summation of all Type B and Type C leakage rates can not exceed 0.6 La (182.6 scfh). Leak rate limits in PT 61.3 are considered guidelines. If a leakage rate exceeds the limit in PT 61.3 but meets the 10 CFR 50, Appendix J and the IST program limits an evaluation is performed by the leak rate engineer to determine if repair will be performed immediately or deferred. If deferred a memorandum is issued by the leak rate system engineer and concurred in by the IST engineer. The inspector reviewed one of these memoranda and

determined that the penetration, specific valve measured leak rate, PT 61.3 leak rate limit, and the IST leak rate limit are identified. The inspector concluded that this review process is acceptable within the regulations but indicated to the leak rate system engineer that the review process should be formalized in the plant procedures and the memorandum should include the factors considered and the basis for deferral of valve repair.

The licensee has identified the six inch diameter mission check valves as problem valves relative to containment leakage. The apparent cause is that due to extended operating conditions the formation of rust and weakening of the spring occur. This results in the failure of the valves to fully seat. To address this problem the licensee intends to replace the valve disks with stainless steel disks and install stronger springs. These modifications will be performed on the six inch diameter mission check valves in Unit 2 during the current outage and in Unit 1 at the next refueling outage. The inspector considered this action as a strength in the program to manage containment leakage.

In review of Type C test valve alignments and discussions with the leak rate engineer the inspector determined that the licensee has reduced the number of tests performed by the "leak by" test method to only a few valves for which the plant configuration does not allow the "make up" air test method. The leak by test method consists of establishing a test volume on the low pressure side of the valve under test and measuring the air leaking into the test volume with a flow meter attached to this volume through a vent or drain connection. The inspector examined one case where the leak by method was used. In this case test pressure is applied through a single line which divides into two parallel lines each containing an isolation valve. Consequently, leakage through both isolation valves is measured simultaneously using the make up air method. With the leak by method, leakage through each valve can be quantified. The feasibility of placing a rotometer in line with the make up air supply was discussed with the leak rate engineer. By measuring the total air supplied, the leak by measurement could be validated. However, the added confidence in the measurement must be balanced against ALARA considerations, critical path time and limited resources. The leak rate engineer indicated that this matter will be considered.

During this inspection, the inspector witnessed Type C tests on penetrations 57B, Pressurizer Relief Tank Gas Space Sample; 103, Refueling Purification Inlet; and 104 Refueling Purification Outlet. From observation of the tests the inspector determined that test instrumentation was calibrated, valve alignment was properly set, systems were adequately drained and vented, and an approved procedure was present on the job and was followed during the testing. In system walkdowns to verify valve alignments the inspector found that component identification was good. The valves were tagged with easily readable tags which specified the valve number and a brief function description. From observations and discussions with test personnel the inspector concluded that these personnel were familiar with the test procedure, the

instrumentation, and the systems and were knowledgeable of leak rate test requirements.

During the testing the inspector observed two minor anomalies which were discussed with the test personnel and resolved. The flow meter (rotometer) was mounted to the test rig in a manner which allowed the meter to swivel left or right from the vertical. Vendor manuals indicate the rotometer must be installed vertically. The inspector observed that the test personnel visually aligned the rotometer in a vertical position prior to taking the reading. However, at the exit interview management agreed to determine the tolerance of deviation from the vertical position and provide reasonable assurance that these tolerances are met.

During valve manipulation the inspector noted that tags were removed from certain valves. Review of this condition showed that these tags were assigned to be removed for test purposes. A tag removal record was completed and the tags are retained in the area to be rehung after testing. A reverification of the tags is performed after the tags are replaced.

The inspector had no further questions on these matters.

3. Action on Previous Inspection Findings (92702)

(Closed): Violation 50-338,339/89-12-01 concerned the performance of Type C tests by applying test pressure in a reverse (non-accident) direction which was nonconservative.

Appendix J to 10 CFR Part 50 allows reverse testing under certain conditions. Reverse testing is applying the pressure differential across a component in the opposite direction from the direction that would be expected under loss-of-coolant accident (LOCA) conditions or when the component is performing its intended function. Also, ASME Boiler and Pressure Vessel Code (ASME BPV Code) Section XI, Subsection IWV, Paragraph 3423, allows containment isolation valves to be tested in the reverse directions for certain specific valve types.

The regulations and the ASME Code allow testing in the reverse direction when it can be shown that a test in the reverse direction is as conservative as a test in the accident direction. Therefore, it is the Nuclear Regulatory Commission (NRC) position that a licensee may perform reverse testing without prior NRC approval. However, the basis for considering a reverse test conservative, as required by the regulations, must be documented in plant records.

The violation consisted of two parts. In Part A the licensee was cited for non-conservative reverse testing of 13 valves in Unit 1 and 15 valves on Unit 2. The licensee concurred with this finding and had completed corrective action. Consequently, no response was required for Part A.

Part B of the violation related to 24 valves in each Unit which were Type C tested in the reverse direction. In an engineering study (88-31) dated December 10, 1988 the licensee concluded reverse testing of these valves was acceptable. In an evaluation of the licensee's engineering study, the NRC concluded that the licensee had not developed sufficient technical information to justify reverse testing of the 24 valves in each Unit involved in the review. A response was requested from the licensee relative to Part B of the violation 89-12-01. In the response dated August 16, 1989, the licensee committed to revising the test procedures to require Type C testing in the accident direction for the valves involved in the citation. On September 18, 1989, the NRC acknowledged acceptance of the licensee's commitment.

During this inspection the inspector reviewed in detail the valve alignments and test conditions for the 24 valves involved in Engineering Study 88-31. The inspector concluded that the test procedures have been revised and these valves are now tested in the accident direction.

This matter is closed.

4. Exit Interview

The inspection scope and results were summarized March 20, 1992, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

The inspector indicated that violation 50-338, 339/89-12-01 has been reviewed and closed.

The licensee indicated that the tolerance for deviation from the vertical position of rotometers will be investigated.